GENERAL INSPECTION PROCEDURE

CENTRAL OFFICE EQUIPMENT

GENERAL EQUIPMENT REQUIREMENTS

LOCAL SYSTEMS OF LARGE RATED CAPACITY

TOLL AND TELEGRAPH SYSTEMS

CONTENTS PAGE

1. GENERAL

1.01 This section provides a general inspection procedure for determining that requirements for installed central office equipment have been met.

1.02 The inspection of any group of equipment to which the requirements of this section apply shall be made after all installation operations are completed that might affect the results and prior to the start of performance tests.

1.03 The procedure specified herein requires a detailed inspection of all or a portion of the equipment involved. The portion inspected shall be selected in accordance with the sampling plans specified.

1.04 This section is supplemented by detailed procedure sections for specific switching systems and by detailed information sections for adjustable apparatus, soldering, and solderless-wrapped connections, all listed in the Index Section 800-668-000.

1.05 The requirements for inspection of the equipment are based on the applicable Bell System Practices in the central office plant series.

1.06 Unless otherwise specified, all defects disclosed in the course of inspection shall be corrected. In the case of adjustable apparatus where both test and readjust requirements are given, the test requirements shall be applied during inspection. For making corrections, readjust requirements shall be used when provided; otherwise, test requirements shall be used.

1.07 The provisions of this section are applicable to reused, relocated, and new equipment as well as equipment affected by wiring changes unless otherwise specified by the operating company. Such applications shall be to determine whether the requirements for the equipment have been met.

1.08 The sequence of the inspection operations and associated corrective operations shall in no case be such as to cause the sampling inspection results to be unrepresentative of the uninspected portion of the equipment.

1.09 The acceptance of part or the entire equipment in an installation on the basis of the inspections made per this section shall in no way relieve the

supplier of responsibility for equipment of unsatisfactory quality.

1.10 There are, in general, three types of inspections required as follows:

(a) ***General Equipment Requirements:*** Equipment designations, wiring, cabling, and framework.

(b) ***General Equipment Requirements:*** Solderless-wrap connecting, soldering, and quick-connect connections.

(c) ***Adjustable Apparatus.***

1.11 Inspection of adjustable apparatus in wired equipment, adjusted and tested in the factory, is limited to conditional inspection where there is evidence that the apparatus adjustments are such that inspection is necessary to correct defects to prevent equipment malfunctions.

> ***Note:*** Temporary field verification shall be instituted for specific characteristics that are determined to be of unsatisfactory manufacturing quality by Quality Assurance.

1.12 Adjustable apparatus mounted and wired during installation shall be inspected 100 percent.

2. NOMENCLATURE

2.01 The following terms are described for reference purposes.

2.02 ***Equipment Group:*** Any quantity of equipment homogeneous in structure, composition, and arrangements. In general, it is the term applied to the equipment comprising the circuits which perform the same function in the switching system. For example: marker frames, link frames, carrier frame, etc. Standard equipment groups for a given type of system are listed in the detailed procedure section for that system, such as 819-011-180, No. 5 Crossbar.

2.03 ***Inspection Item:*** Any characteristic, property, or feature for which inspection is required.

2.04 ***Lot:*** The total quantity of material or equipment under consideration or the total number of pieces under consideration, each one of which has one or more inspection items common to all.

(a) Balance of lot is the number of units in the lot less the number in the sample.

2.05 ***Sample:*** A part of the total under consideration that is presented as evidence of the whole. It comprises the number of pieces selected from the lot for inspection.

(a) Subsample is a portion of the sample, usually by frame, code, etc.

2.06 ***Defect:*** A failure of any characteristic, property, or feature to meet a requirement for an inspection item.

2.07 ***Allowable Defect Number (AN):*** The allowable number of defects for a given inspection item which, if exceeded in the sample, is an indication that the product quality for that inspection item is questionable.

2.08 ***Spottiness:*** The condition where the concentration of defects for any inspection item within a natural subdivision of a lot (sublot) is in excess of that to be expected from sampling fluctuations.

> ***Note:*** The application of spottiness is permitted only where SN tables are provided on the detailed information section, such as 800-668-156, for 280-type relays.

2.09 ***Spottiness Number (SN):*** The number of defects for a given inspection item which, if exceeded in a subsample, indicates that an excessive concentration of defects exists in the corresponding subdivision of the lot (sublot).

2.10 ***General Type of Apparatus:*** Plant Series BSPs are used for inspection of each general type of adjustable apparatus. They generally contain one or more types of adjustable apparatus with the same or similar characteristics.

2.11 ***Inaccessible Connections:*** Those connections that are not directly visible without displacing wiring or removing apparatus or equipment parts. Multiple bank wiring on 200-type and similar type selectors and wiring on step-by-step switch relays are examples of connections considered inaccessible.

2.12 ***Detailed Procedure Section:*** Procedures individual to one or more central office system. For example, the inspection procedures individual to No. 5 crossbar systems are covered in Section 819-011-180.

2.13 ***Detailed Information Section:*** The sampling information relating to lot size, sample size, allowable defect numbers, etc, for a given general type of apparatus. An individual section is issued for each general type of apparatus and for soldering and solderless-wrap connecting. As an example, the detailed information section for crossbar switches is outlined in Section 800-668-175, for soldering Section 800-668-152, and for solderless-wrap connecting in Section 800-668-153. When the AN is exceeded for any inspection item, the balance of the lot shall be inspected for that item and all defects found corrected.

2.14 ***Conditional Inspection:*** Consists of an inspection of apparatus excluded from regular verification that evidence indicates may be of substandard quality.

3. CENTRAL OFFICE INSPECTION PROCEDURE

GENERAL

3.01 Central office inspection of installed equipment requires that distinct equipment groups be established. These equipment groups are listed in the detailed procedure section for the system involved, such as No. 1 crossbar, step-by-step, etc. Each general type of apparatus or equipment occurring in one or more of such equipment groups will make up a lot. In some cases, the lot will consist of apparatus or equipment on a number of similar assembled units such as frames, bays, sections, etc, as specified in the detailed procedure section for the system involved. The portion of a lot occurring on each such unit is known as a sublot.

3.02 A sample selected from the lot should consist, where practical, of units from each sublot. The units selected from each sublot are known as subsamples.

3.03 The inspection operation consists of the examination of each lot or sublot to determine whether the quality of the lot is satisfactory.

3.04 Agreement of the equipment and apparatus of a central office in type and quantity with the specifications and other engineering information for the office shall be considered an inspection item. Where cases of wrong type or shortage of apparatus or equipment are observed during the inspection for apparatus adjustments (when required) or for general equipment requirements, a complete inspection shall be made for similar cases throughout the equipment within which such a condition is observed.

3.05 When making inspections, if it is observed that parts are inoperative, damaged, or missing, sufficient inspection shall be made throughout the group, when such a condition is observed, to ensure its elimination.

3.06 Whenever it is observed during installation that parts are affected by rust, corrosion, or marred finish, sufficient inspection shall be made to determine the extent of such occurrence. Such conditions shall be corrected when feasible. The following factors shall determine the nature and extent of the corrective action to be taken:

(a) Extent of area affected.

(b) Location.

(c) Likelihood of further development.

(d) Cost of repair or replacement.

3.07 Individual detailed information sections specify the lot and sample sizes, allowable defect numbers (AN), and spottiness numers (SN) as they apply. These sections, together with the provisions of this section and of the supplementary detailed procedure section for the system involved, provide the necessary detailed information for verification inspection.

(a) The inspection items are listed in the detailed information sections for each general type of adjustable apparatus and for soldering and solderless-wrapped connections. The inspection items are taken from the Plant Series Bell System Practices involved.

(b) Where a given inspection item has two or more parts on which the same inspection item appears, the classification in the column headed "Basis for Counting Defects" indicates

whether the multiple appearance of defects or only a single defect should be counted against the unit. In the case of general purpose wire spring relays, there are several springs involved for contact sequence. In this case, the "Basis for Counting Defects" is indicated as the "relay." Therefore, if more than one set of springs fail to meet this requirement, only one defect should be counted. Practically all inspection items on relays are counted on the basis of the relay.

3.08 The following steps are outlined for the purpose of establishing the main points pertinent to central office inspection:

(1) Divide the central office equipment into equipment groups. See the detailed procedure section for the system involved.

(2) Determine the lot size for the equipment or apparatus to be inspected from the groups established.

(3) When detailed information sections are provided, determine the sample size and, based on a random distribution to ensure representative results, select the sample.

(4) Record the lot and sample size selected on forms furnished for this purpose and record the defects found.

(5) After the inspection results have been recorded for soldering, solderless-wrapped connections, and adjustable apparatus, when required, examine each inspection item to determine if specified AN (allowable defect number) is exceeded. If AN is exceeded, inspect balance of lot for that characteristic and correct all defects. If AN is not exceeded, the lot is considered satisfactory after the defects found are corrected.

WIRING, CABLING, FRAMEWORK, AND EQUIPMENT DESIGNATIONS

3.09 General equipment requirements for framework, wiring, cabling, and equipment designations require only a general inspection unless a complete inspection is required because of abnormal conditions brought about by job conditions. A general inspection does not normally involve a determination of lots based on equipment groups. Accordingly, the entire equipment involved in the installation may be considered as a single lot or subdivided into several lots to suit the convenience of the inspection operation.

(a) The inspection items for these features are those specified in the installing requirements sections of series 800-614-151 through 164 and that meet the accepted standards of good workmanship.

(b) Rolling ladders, power plant equipment, fuse bays, and alarm frames or boards shall be inspected completely for wiring, framework, cabling, and equipment designations as they apply.

(c) On circuits with optional wiring, a verification shall be made of the specified wiring.

(d) A verification shall be made of all electrolytic capacitors, diodes, transistors, etc.

(e) Where cable pairs, quads, or other groupings are indicated, the grouping shall be verified.

(f) Protective grounding in accordance with Section 800-001-180 shall be verified.

(g) A verification inspection of the continuity of all installer wiring to terminal strips, plugs, apparatus cores, apparatus cases, apparatus and equipment shields, and the shields on shielded wiring shall be made in accordance with drawings and general equipment requirements. Where the connection is at more than one point on the apparatus or shielded wire, each point shall be verified visually.

SOLDERLESS-WRAPPED CONNECTIONS, SOLDERING, AND QUICK-CONNECT CONNECTIONS

3.10 ***Solderless-Wrapped Connections:*** Detailed information Section 800-668-153 furnishes the list of inspection items for this feature of equipment. The requirements for the items listed herein are furnished in Section 800-612-154. This inspection is divided into (1) an inspection of the ability of wrapping bits to make test connections which meet the requirements for stripping and unwrapping and (2) a visual inspection with respect to clearance and required number of turns.

(a) Solderless-wrapped connections made during the installation period are considered separately

from those made prior to installation. In general, the inspection of solderless-wrapped connections made prior to installation is not required as part of the installation verification.

3.11 ***Soldered Connections:*** Detailed information Section 800-668-152 furnishes a list of inspection items for this feature of equipment. The requirements for the items listed herein are furnished in Section 800-612-154. This inspection is limited to a check of the security of soldered connections and of clearance between terminals.

3.12 Inspection for requirements applying to connection shall be carried out by observation during the inspection of soldering as covered in the notes furnished in Section 800-668-152.

3.13 Inspection of inaccessible soldered connections is required only if testing results or other evidence indicate an unsatisfactory condition. If inspection of inaccessible soldered connections is required, these should be treated as a separate lot.

3.14 Soldering done during installation is considered separately from that done prior to installation. In general, the inspection of soldering done prior to installation is not required as part of the installation verification. Unless otherwise specified, soldering done during installation may be considered as a single lot or subdivided into several lots.

3.15 Soldered connections made by the installer on power plant equipment shall be inspected completely.

3.16 Soldered connections made by the installer on coaxial and twin conductor shielded office cable shall be inspected completely on an in-process basis since they become inaccessible after installation operations are completed. The in-process inspection shall be made in accordance with the requirements of Section 800-612-164.

3.17 ***Quick-Connect Connections:*** There is no inspection table in the detailed information sections for quick-connect connections. They shall be inspected in accordance with the requirements for making connections to quick-connect type terminals outlined in Section 800-612-154.

ADJUSTABLE APPARATUS

3.18 Complete inspection is required for all requirements on job mounted adjustable apparatus and on job wired apparatus. This is necessary because apparatus not furnished as part of wired equipment units at the factory is adjusted only to manufacturing requirements and not to specific circuit requirements as specified in CR tables.

3.19 Sampling inspection (conditional) is applied to adjustable apparatus in wired equipment on a selected item (SI) basis as required.

3.20 For the inspection of apparatus adjustments, each general type shall be considered separately. The lot for any particular type of apparatus shall consist of the total number of units of that type in the respective equipment groups involved.

3.21 After the lot size is determined for the general type of apparatus involved, refer to the detailed information section (such as Section 800-668-156, 280-type relays) for the lot size and the corresponding sample size and inspect for the characteristic or characteristics involved. If the defects found do not exceed the allowable number of defects (AN) for the sample size for the characteristic under inspection, the lot is considered to be satisfactory after the defects found are corrected.

3.22 In those instances where the AN is exceeded for a particular characteristic, the results of the inspection should be examined to determine if there is a concentration of defects on a frame or series of frames or for apparatus of a particular code, designation, etc. If such is the case, it is probable that a spotty condition exists and spottiness procedures should be applied to avoid extending the inspection to the balance of the lot because of the AN excess. Spottiness procedures, however, apply only where spottiness numbers (SN) are furnished in the detailed information section involved.

(a) Where a spotty condition is believed to exist, select a lot (sublot) that includes most of the suspected spotty condition. Having determined the sublot size, determine the subsample required from the SN table. Select a random subsample and inspect for defects. If the number found does not exceed the SN number, the spottiness

criteria does not apply and the AN excess prevails.

(b) If the SN number is exceeded, spotty condition does exist, and the following action should be taken:

(1) Inspect the balance of the sublot for the characteristic involved and correct all defects found.

(2) Select another sublot and a sample from it and inspect for defects. If defects found do not exceed the SN number, correct all defects found.

(3) Again determine if AN is exceeded after excluding the total number of SN defects encountered.

(4) If AN is not exceeded, accept the lot after correcting all AN defects. If AN is exceeded, inspect the lot 100 percent for the characteristic or characteristics involved and correct all defects.

3.23 Where the AN is exceeded and spottiness procedures do not apply or have not been applied, inspect the balance of the lot for the characteristic and correct all defects.

3.24 Where the AN is exceeded by more than five times or there are more than four defects if AN=0, assume the quality of the lot is subnormal and inspect for all characteristics in the lot 100 percent.

(a) Reinspect the lot on a sampling basis for the characteristic or characteristics involved and for any associated characteristic that might be affected by the reinspection. Correct all defects found.

(b) If on reinspection in 3.24 (a) the AN is not exceeded, accept the lot. If AN is exceeded, follow the procedure of inspecting the balance of the lot for that characteristic.

4. RECORDS AND REPORTS

INSPECTION RECORDS

4.01 A record shall be kept of all inspections made in accordance with the requirements of this section.

INSPECTION REPORTS

4.02 All reports for inspection shall show the following information:

(a) Type of equipment.

(b) Name of office.

(c) City and State.

(d) Order number.

(e) Turnover date.

(f) Date of completion of inspection of lot.

(g) Lot size and sample size.

(h) No. of defects chargeable to the sample.

(i) Where spottiness numbers apply, the number of subsamples where SN was exceeded.

4.03 ***Copies of inspection reports*** shall be furnished to the Quality Assurance Center, Bell Telephone Laboratories, Holmdel, New Jersey.

(a) Copies of inspection reports shall also be furnished to the operating company on request.

5. REASONS FOR REISSUE

1. The entire section has been revised. No arrows are shown.